Exploring Sectoral Contributions to Growth in Fiji: a focus on Agriculture Development

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Abstract
In this study, we explore the contribution from agriculture, manufacturing and services to the economic growth of Fiji. The results show in the long-run, services sector has the largest contribution (0.91 percent), followed by manufacturing (0.88 percent) and agriculture (0.22 percent). In the short run, mixed contribution from manufacturing and services due to short-run shocks and negative contribution from agriculture due to poor performances of key agricultural activities raises concern for long term economic sustainability. Therefore, key sub-sector integrated policies and reforms to improve and capitalise on agriculture, manufacturing and services are put forward as pro-growth measures for sustainable development and policy dialogue.

Keywords
Agriculture, manufacturing, services, economic growth, ARDL Bounds Test, Fiji.

1. Introduction
Fiji's economy is characterised by agriculture, manufacturing and services. However, the agriculture industry is not performing to the levels it used to prior to year 2000, and the dependency on services sector, particularly tourism and remittance inflows have grown over the years.

Despite the marginal growth in GDP of 0.1 percent in 2010, the economy on average has been experiencing negative growth. The positive growth experienced as a result of booming tourism sector, mineral water production and gold and fisheries. However, the overall poor performance of the economy has been attributable to decline in productivity and natural disasters such as Cyclone Tomas in 2010, prolonged droughts and the continued poor performance in the sugar industry due to inherent teething problems have further dampened the prospects for agricultural sector growth.

In the midst of all these, the erosion of preferential sugar prices in the European Union (EU) market remains a concern for the economy. In the last few decades, sugar was the key export of Fiji. However, the industry is overshadowed once the Cotonou Agreement that granted preferential market access of sugar in the EU markets is coming to an end. Although the current Economic Partnership Agreement of Fiji with the EU has aimed to provide a duty free and quota free access of sugar in the EU markets, these are subject to debate given the preference erosion of the product.

Consequently, in a broad context, the economy is challenged with rising inflation, decline in real income, rising poverty and high debt levels. The need for investment in infrastructure, redeployment of government's non-performing assets and greater private sector involvement are identified as critical remedial measures (ADB, 2011; 2010; RBF, 2010). On the other hand, manufacturing sector, mainly characterised by gold, quarry, mineral water production, and food processing industries among others, on aggregate has also been growing, however steadily.

In hindsight, it is important to explore the sectors which are contributing to the economic activity of the economy. The paper looks at the broader sectoral contributions to growth in Fiji and highlights some pertinent matters for the long-term sustainability of the economy. With no prior study done with reference to the Pacific Island Countries (PICs), this paper aims to modestly contribute towards ascertaining the contributory powers from the three broad sectors, namely agriculture, manufacturing and services.

The study is important in at least two ways. Firstly, we analyse the sectoral contribution towards long-run growth which will help policy-makers to target policy towards sectors needing immediate attentions, and secondly, we provide a method that can be used if not challenged by other researchers analysing sectoral contribution to growth.

The rest of the paper is organised into five sections. The second section provides a brief review of literature covering studies done at sectoral levels in various countries; the third section examines recent trends in the three sectors vis-à-vis the selected PICs. The fourth section outlines the methodology adopted to undertake the empirical study followed by the results. Finally, conclusion is provided with some policy matters for further discussion.

2. A brief literature survey

The importance of agriculture in providing cheap food, raw materials, labour, savings, and consequent demand for non-agricultural commodities has been well documented and considered as the engine of growth. Further, agriculture has the export generating capacity, particularly for economies that are in their early stages of development and heavily reliant on primary resources (Johnston and Mellor, 1961; Lewis, 1954).

Moreover, agriculture is an important sector for low-income countries providing employment to about 60 percent of the labour force and accounts for about 25 percent of GDP. However, balancing agriculture and industry (manufacturing and services) is an important yet a difficult dimension of development policy given the fact that the multi-dimensional causality between agriculture, manufacturing and services are largely influenced by various factors, among which relative differences in farm size, missing markets for insurance and credit or links to financial markets, limited market access and market information, and insecure property and usage rights are at the forefront. Therefore the prime task of getting the fundamental institutions right for agriculture development becomes critical to sectoral development (Dethier and Effenberger, 2011).

For a good example of the impact agriculture has on economic progress, various researchers compare and differentiate the African agriculture with the East Asian by scrutinising the magnitude of agricultural expenditure, price regimes, macroeconomic policies, political stability, health, education and infrastructure in these regions (Bezemer and Heady, 2008; Diao, Hazell, Resnick and Thurlow, 2006; Mosley, 2002; Lipton, 1987).

Some recent empirical analysis has shown also that agricultural value added is primarily significant for developing countries (Self and Grabowski, 2007; Tiffin and Irz, 2006). De Janvry and Sadoulet (2009), using China as a case study, find that a one percent agricultural growth contributes to about 0.45 percent to aggregate growth. However, on

the basis of panel data from 52 developing countries, Gardner (2005) concluded that agriculture does not seem to be a primary force behind growth in per capita income. Subsequently, despite the initial high base cost, the use of modern inputs is required to boost agricultural productivity (Restuccia, Yang and Zhu, 2008).

The spill-over effects from agriculture results in significantly larger contribution and positive multiplier effects across sectors. Some factors explaining this nexus are the tradability and transferability of inputs and outputs, employment shares in agricultural sectors, consumption patterns, distributional impacts of income and assets, the excess underemployed resource and urbanisation (Bravo-Ortega and Lederman, 2005; Dorosh and Haggblade, 2003; Gollin, Parente and Rogerson, 2002; Timmer, 2002; Delgado, Hopkins, Kelly and Hazell, 1998; Lipton, 1977).

On the other hand, development in agriculture is hindered by market failures and distortions which arise due to information asymmetry, high transaction costs, labour market distortions, income volatility, poor rural investment in research and innovation, and changes in climatic conditions, thus underscoring the role of state in ameliorating these hurdles (Dorward, Kydd, Morrison and Urey, 2004; Binswanger and Deininger, 1997).

Furthermore, the relationship between agriculture and overall economic growth mainly depends on the openness of a country to international trade (Matsuyama, 1992). In exploring more than two-sector model, Dercon (2009) argues that in an open economy in which agricultural and modern (non-agriculture) sector goods can be traded, the links between the two sectors becomes of secondary importance as far as growth and poverty reduction process is concerned since both sectors have potential to contribute to growth. Consequently a large share of agriculture in many developing countries does not mean that growth is primarily based on agriculture-demand led industrialisation strategy. Similarly, Gollin (2010) posits that in countries where agriculture is having low productivity than other sectors, it is economical to import food and divert resources to more productive sectors besides agriculture.

In referring to manufacturing contributions, Rodrik (2008) with reference to South Africa shows that the health of manufacturing sector is vital for both growth and employment as the sector enables skill upgrading, capital deepening and enhancement in worker productivity when more capital is invested by the sector. In the same vein, Rajan and Subramanian (2011) underscores the importance of channelling aid thoughtfully to develop manufacturing sector whilst highlighting the importance of manufacturing exports as a vehicle for growth take-off, despite agriculture having greater prominence in the earlier stages of development.

With regard to services, its contribution to growth, investment and employment have increased dramatically and particularly for those countries where services are relatively cheaper due to low wage cost and growth in the level of development (Banga and Goldar, 2004; Kongsamut, Rebelo and Xie, 2001; Francois and Reinert, 1996; Chenery, 1960). However splintering effect (when indirect production activities are outsourced thus raising the demand for producer services as intermediate input) has influenced the growth of service sector (Bhagwati, 1984).

Services sectors such as energy (Jalava and Pohjola, 2008) and tourism (Kumar and Kumar, 2012) vis-à-vis information and communication technology has been identified as critical to growth. Further, emphasis has been placed on encouraging remittances and improving financial services in developing countries (Samoa, Tonga, Fiji, Vanuatu, Pakistan) to have long-term growth and development (Jayaraman, Choong and Kumar, 2010a; 2010b; 2009; Kumar, 2011a; 2011b).

3. Trends in Sectoral Trade

Fiji, whose key indicators are given in Table 1, is one of the most industrialised developing countries in the Pacific region.

Table 1: Selected key indicators for Fiji

Land Area (Sq.km.'000)	18.3
Population (2008: '000)	838.7
Per Capita GDP (US$) Current Prices (2009)	3326.4
Aid Per Capita in US$ (2008)	53.6
Aid as percentage of GDP (2004-2008)	1.8
Annual Average Growth Rate in percent (2004-2009)	0.6
Annual Average Inflation in percent (GDP deflator) (2001-2008)	4.1
Fiscal Balance of Central Government as percent of GDP (2004-2006)	-4.9
Current Account Balance as percent of GDP (2001-2008)	-13.5

Source: World Bank (2010)

In terms of sectoral share comparison across selected PICs, using 2008 as a reference point, agriculture as a percent of GDP is highest for Solomon Islands (41%) and PNG (34%) followed by other PICs (Table 2). In case of manufacturing, Fiji (14%) and Samoa (13%) are in the lead (Table 3) and for services (as a percent of GDP), Vanuatu and Fiji are ahead (about 68 percent of GDP). Interestingly, except for PNG, all other PICs have recorded high percentages of services as a share of their respective GDPs (Table 4).

Table 2

	Agriculture (%GDP)							
Country	**1971-1980**	**1981-1990**	**1991-2000**	**2001-2005**	**2006**	**2007**	**2008***	**2009**
Solomon Is.	n.a.	28.9	42.7	33.4	35.7	44.3	41.2	38.9
PNG	33.9	34.5	32.9	38.5	35.9	36.0	33.6	35.9
Kiribati	19.6	29.4	27.6	25.2	26.0	27.3	27.6	28.6
Vanuatu	20.4	22.6	19.9	25.2	22.6	22.8	21.6	n.a.
Tonga	43.6	37.6	28.5	22.4	19.6	20.9	19.3	19.6
Fiji	24.1	19.9	19.2	14.7	14.5	13.9	14.6	13.2
Samoa	n.a.	n.a.	19.2	13.7	12.0	12.2	11.7	11.9

* ranked by 2008 figures. Averages calculated by the author; n.a. – figures not available
Source: World Bank (2010)

Table 3

	Manufacturing (%GDP)							
Country	**1971-1980**	**1981-1990**	**1991-2000**	**2001-2005**	**2006**	**2007**	**2008***	**2009**
Fiji	11.6	10.8	14.1	14.7	14.9	14.2	13.9	14.0
Samoa	n.a.	n.a.	16.8	16.6	14.6	13.1	13.1	9.4
Tonga	6.7	5.3	8.2	9.5	8.6	9.0	8.7	8.1
Kiribati	1.8	1.1	5.8	4.7	4.8	5.6	5.9	6.2
PNG	8.1	10.8	9.0	6.9	6.1	6.1	5.6	5.9
Vanuatu	4.1	4.5	4.7	4.6	4.1	3.8	4.4	n.a.
Solomon Is.	n.a.	2.4	8.3	6.8	4.8	3.9	3.9	3.8

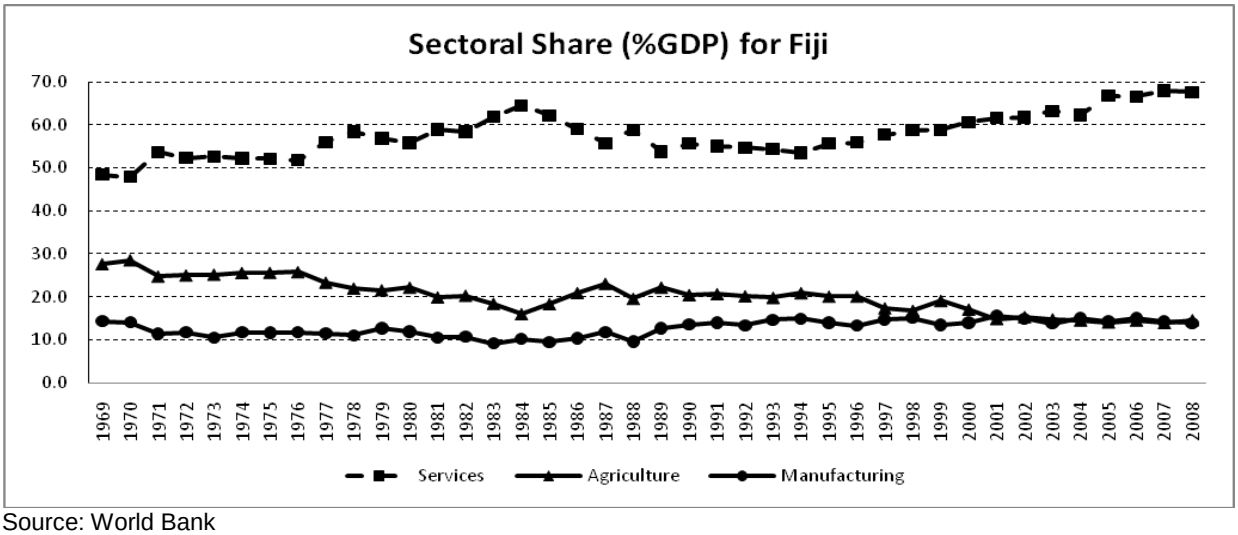
* ranked by 2008 figures. Averages calculated by the author; n.a. – figures not available.
Source: World Bank (2010)

Table 4

	Services (%GDP)							
Country	**1971-1980**	**1981-1990**	**1991-2000**	**2001-2005**	**2006**	**2007**	**2008***	**2009**
Vanuatu	73.3	67.0	69.3	65.7	68.5	68.4	68.3	n.a.
Fiji	54.2	58.9	56.5	63.1	66.6	68.0	67.6	68.8
Kiribati	42.5	62.9	62.4	65.3	66.4	64.7	63.7	61.8
Tonga	43.7	48.2	53.2	57.3	62.3	60.4	62.0	61.9
Samoa	n.a.	n.a.	54.0	56.8	57.7	57.4	57.7	61.4
Solomon Is.	n.a.	66.1	43.1	56.0	57.6	49.8	52.7	55.0
PNG	36.0	35.4	30.5	22.6	19.0	19.2	18.4	19.6

* ranked by 2008 figures. Averages calculated by the author; n.a. – figures not available.
Source: World Bank (2010)

In Fiji's case, services (as a percent of GDP) have increased dramatically between 1969 to 2008 periods (Figure 1). Manufacturing (as a percent of GDP) has shown a marginal increase while the agriculture (as a percent of GDP) has shown a downward trend over the sample period.



Source: World Bank
Figure 1

4. Data, Method and Results

The analysis uses 39 years annual data for the period 1969-2008. The capital stock utilised for the study has been built up by perpetual inventory method. As regards to labour, population as a proxy is used, since there is no consistent time series data on employment. All data including agriculture (value added), manufacturing (value added) and services (value added) as a percent of GDP are sourced from *World Development Indicators and Global Development Finance,* World Bank database (World Bank, 2010).

Subsequently, (i) agriculture (AGR_t); (ii) manufacturing (MAN_t) and services (SER_t) are used in the conventional Cobb-Douglas production function, with the Hicks–neutral technical progress. The per worker output (y_t) equation is defined as:

$$y_t = A_t k_t^{\alpha}, \qquad 0 < \alpha < 1 \tag{1}$$

where A = stock of technology and k = capital per worker, and α is the profit share. The Solow model assumes that the evolution of technology is given by

$$A_t = A_o e^{gT} \tag{2}$$

where A_0 is the initial stock of knowledge and T is time.

It is also plausible to assume that:

$$A_t = f(T, AGR_t, MAN_t, SER_t) \tag{3}$$

The effect of AGR_t, MAN_t, and SER_t on total factor productivity (*TFP)* can be captured when they are entered as shift variables into the production function, noting labour and capital as fundamental variables explaining growth:

$$A_t = A_o e^{gT} AGR_t^{\beta} MAN_t^{\lambda} SER_t^{\gamma} \quad (4)$$

$$y_t = (A_o e^{gT} AGR_t^{\beta} MAN_t^{\lambda} SER_t^{\gamma}) k_t^{\alpha} \quad (5)$$

The above can be formulated as:

$$\Delta Ly_t = g_t + \beta \Delta LAGR_t + \lambda \Delta LMAN_t + \gamma LSER_t \quad (6)$$

where, *L* denotes logs of respective variables, and the intercept term g_t is *TFP* due to other likely growth factors, which are not included in the analysis.

Since the number of observations is small, the bounds testing approach under ARDL procedure developed by Pesaran (Pesaran, Shin and Smith, 2001) is deployed. In bounds testing approach, pre-testing of unit roots is not required and it is possible to investigate cointegration of the levels of the variables, irrespective of their order. With a view to meeting the criticism that it is difficult to accept that variables of different orders are cointegrated, the unit root tests are first conducted to ensure they are of the same order before entering them into analysis.

In computing unit root tests to examine the time series properties of the variables, the ADF and Phillips-Perron test statistics are used. From the test results, all variables are non-stationary in their levels however they are stationary in their first differences (Table 5).

Table 5: Results of Unit Root Tests

Variable	ADF		Phillips and Perron	
	Level	First Difference	Level	First Difference
Ly	-1.806214	-7.660990*	-2.412062	-7.663610*
Lk	-0.941955	-10.43753*	-4.099925	-8.061778*
LAGR	-1.381056	-7.413664*	-1.180516	-8.268047*
LMAN	-2.197640	-8.689308*	-2.108459	-8.774897*
LSER	-1.569673	-7.578810*	-1.569673	-7.545122*

Notes: The ADF critical values are based on Mckinnon. The optimal lag is chosen on the basis of Akaike Information Criterion (AIC). The null hypothesis for both ADF and Phillips-Perron tests is a series has a unit root (non-stationary). * denotes the rejection of the null hypothesis of unit root at 1% level of significance.

The next step is to examine the existence of a long run relationship between real per capita output (y_t), capital per worker (k_t), agriculture (AGR_t), manufacturing (MAN_t) and services (SER_t) by using bounds test.

The ARDL equations are specified as follows:

$$\Delta Ly_t = \beta_{10} + \beta_{11} Ly_{t-1} + \beta_{12} Lk_{t-1} + \beta_{13} LAGR_{t-1} + \beta_{14} LMAN_{t-1} + \beta_{15} LSER_{t-1} + \beta_{16} TREND + \sum_{i=1}^{p} \alpha_{11i} \Delta Ly_{t-i} + \sum_{i=0}^{p} \alpha_{12i} \Delta Lk_{t-i} + \sum_{i=0}^{p} \alpha_{13i} \Delta LAGR_{t-i} + \sum_{i=0}^{p} \alpha_{14i} \Delta LMAN_{t-i} + \sum_{i=0}^{p} \alpha_{15i} \Delta LSER_{t-i} + \varepsilon_{1t} \quad (7)$$

$$\Delta Lk_t = \beta_{20} + \beta_{21}Ly_{t-1} + \beta_{22}Lk_{t-1} + \beta_{23}LAGR_{t-1} + \beta_{24}LMAN_{t-1} + \beta_{25}LSER_{t-1} + \beta_{26}TREND + \sum_{i=1}^{p}\alpha_{21i}\Delta Ly_{t-i} + \sum_{i=0}^{p}\alpha_{22i}\Delta Lk_{t-i} + \sum_{i=0}^{p}\alpha_{23i}\Delta LAGR_{t-i} + \sum_{i=0}^{p}\alpha_{24i}\Delta LMAN_{t-i} + \sum_{i=0}^{p}\alpha_{25i}\Delta LSER_{t-i} + \varepsilon_{2t} \quad (8)$$

$$\Delta LAGR_t = \beta_{30} + \beta_{31}Ly_{t-1} + \beta_{32}Lk_{t-1} + \beta_{33}LAGR_{t-1} + \beta_{34}LMAN_{t-1} + \beta_{35}LSER_{t-1} + \beta_{36}TREND + \sum_{i=0}^{p}\alpha_{31i}\Delta Ly_{t-i} + \sum_{i=0}^{p}\alpha_{32i}\Delta Lk_{t-i} + \sum_{i=1}^{p}\alpha_{33i}\Delta LAGR_{t-i} + \sum_{i=0}^{p}\alpha_{34i}\Delta LMAN_{t-i} + \sum_{i=0}^{p}\alpha_{35i}\Delta LSER_{t-i} + \varepsilon_{3t} \quad (9)$$

$$\Delta LMAN_t = \beta_{40} + \beta_{41}Ly_{t-1} + \beta_{42}Lk_{t-1} + \beta_{43}LAGR_{t-1} + \beta_{44}LMAN_{t-1} + \beta_{45}LSER_{t-1} + \beta_{46}TREND + \sum_{i=0}^{p}\alpha_{41i}\Delta Ly_{t-i} + \sum_{i=0}^{p}\alpha_{42i}\Delta Lk_{t-i} + \sum_{i=0}^{p}\alpha_{43i}\Delta LAGR_{t-i} + \sum_{i=1}^{p}\alpha_{44i}\Delta LMAN_{t-i} + \sum_{i=1}^{p}\alpha_{45i}\Delta LSER_{t-i} + \varepsilon_{4t} \quad (10)$$

$$\Delta LSER_t = \beta_{50} + \beta_{51}Ly_{t-1} + \beta_{52}Lk_{t-1} + \beta_{53}LAGR_{t-1} + \beta_{54}LMAN_{t-1} + \beta_{55}LSER_{t-1} + \beta_{56}TREND + \sum_{i=0}^{p}\alpha_{51i}\Delta Ly_{t-i} + \sum_{i=0}^{p}\alpha_{52i}\Delta Lk_{t-i} + \sum_{i=0}^{p}\alpha_{53i}\Delta LAGR_{t-i} + \sum_{i=1}^{p}\alpha_{54i}\Delta LMAN_{t-i} + \sum_{i=1}^{p}\alpha_{55i}\Delta LSER_{t-i} + \varepsilon_{5t} \quad (11)$$

There are two steps in examining the relationship between Ly_t, Lk_t, $LAGR_t$, $LMAN_t$, and $LSER_t$. First, eqns (7) to (11) are estimated by ordinary least squares techniques. Second, the existence of a long-run relationship can be traced by imposing a restriction on all estimated coefficients of lagged level variables equating to zero. Hence, bounds test is based on the F-statistics (or Wald statistics) with the null hypothesis of no cointegration ($H_0 : \beta_{i1} = \beta_{i2} = \beta_{i3} = \beta_{i4} = \beta_{i5} = 0$) against its alternative hypothesis of a long-run cointegration relationship ($H_1 : \beta_{i1} \neq \beta_{i2} \neq \beta_{i3} \neq \beta_{i4} \neq \beta_{i5} \neq 0$). The results of the bounds test are reported in Table 6, confirming the presence of a long run relationship amongst the variables when only real output per worker (Ly_t) is set as the dependent variable. The computed F-statistics for Ly_t is 5.728, which is significant at 1 percent level.

Table 6: Results of Bound Tests

Dependent Variable	**Computed F-statistic**
Ly	5.728*
Lk	1.930
LAGR	1.289
LMAN	2.560
LSER	1.074

Critical Value	**Pesaran, Shin and Smith. (2001)[a]**	
	Lower bound value	Upper bound value
1 per cent	3.74	5.06
5 percent	2.86	4.01
10 percent	2.45	3.52

[a] Critical values are obtained from Pesaran, Shin and Smith (2001), Table CI.iii: Case III with unrestricted intercept and no trend, p. 300. * indicates significance at 1% level.

Table 7: Dependent variable: *RGDP/Labour* (*Ly*) ARDL(3,5,5,5,2)

Long-run coefficients				Short-run coefficients			
Regressor	**Coefficient**	**t-ratio**		**Regressor**	**Coefficient**	**t-ratio**	
Lk	0.264	2.6164	**	*ΔLY1*	0.888	3.217	***
LAGR	0.224	2.1626	*	*ΔLY2*	0.462	3.075	***
LMAN	0.768	9.7135	***	*ΔLK*	0.170	0.755	
LSER	0.911	5.2196	***	*ΔLK1*	0.639	2.414	**
C	- 0.060	- 0.0488		*ΔLK2*	-0.981	-2.896	**
T	- 0.002	- 1.1529		*ΔLK3*	0.170	0.566	
				ΔLK4	-0.278	-2.075	*
				ΔLMAN	0.533	6.626	***
				ΔLMAN1	-1.128	-4.237	***
				ΔLMAN2	-0.441	-2.121	**
				ΔLMAN3	-0.363	-2.495	**
				ΔLMAN4	-0.086	-0.945	
				ΔLSER	1.243	3.852	***
				ΔLSER1	-1.494	-3.613	***
				ΔLSER2	0.196	0.708	
				ΔLSER3	-0.383	-1.895	*
				ΔLSER4	0.248	1.116	
				ΔLAGR	0.203	1.577	
				ΔLAGR1	-0.386	-2.692	**
				C	-0.117	-0.049	
				T	-0.003	-1.053	
				ECT (-1)	-1.930	-4.943	***
				$\bar{R}^2$		0.81	
				DW-statistics		2.7276	

	Diagnostic Tests			
	LM Version	p-value	F Version	p-value
Serial Correlation	$\chi^2(1) = 13.4910$	0.00	F(1,8) = 5.0178	0.06‡
Functional Form	$\chi^2(1) = 1.9118$	0.17†	F(1,8) = 0.4622	0.52†
Normality	$\chi^2(2) = 0.4571$	0.80†	Not applicable	
Heteroscedasticity	$\chi^2(1) = 3.1025$	0.08‡	F(1,33) = 3.2098	0.08‡

*** - Significant at 1% level, ** - significant at 5% level and * - significant at 10% level.

†(‡)Rejection of null hypothesis at 1% (5%) level of significance;

Having confirmed the existence of a long-run relationship between per capita output with per capita capital stock, AGR_t, MAN_t, and SER_t, a number of diagnostic test results (see the lower panel of Table 7), such as Lagrange multiplier test of residual serial correlation, Ramsey's RESET test using the square of the fitted values for correct functional form, normality test based on a test of skewness and kurtosis of residuals, and heteroscedasticity test based on the regression of squared residuals on squared fitted values, showed that the equation performed well as the disturbance terms are normally distributed and serially uncorrelated with homoscedasticity of residuals, confirming the model has a correct functional form. Besides, the CUSUM and CUSUM of Squares plot showed that the parameters of the model are relatively stable over time (not reported here).

Table 8: Granger Causality Tests with ECT from bounds test

	F-Statistics					ECT
	ΔLy	*ΔLk*	*ΔLAGR*	*ΔLMAN*	*ΔLSER*	(t-statistics)
ΔLy	-	1.92684	4.52573***	3.40413**	4.04040***	-1.930 (-4.943)‡
ΔLk	1.81558	-	2.24680*	1.33774	4.08627***	-0.39669 (-3.5082)‡
ΔLAGR	1.15812	2.64368**	-	1.95999	0.81963	-.76803 (-2.2170)†
ΔLMAN	2.64734**	2.15328*	1.70574	-	1.55297	-2.0649 (-4.7181)
ΔLSER	0.63999	0.90962	0.80827	1.45983	-	-1.1140 (-2.2908)†

*, **, and *** indicates rejection of the null hypothesis of no causality at 1%, 5% and 10% respectively;
‡ and † indicates (**) significance level at 1% and 5% respectively based on t-statistics and correct sign.

The long run equation shows the contribution from: (a) service sector is about 0.91 percent; (b) manufacturing sector is about 0.77 percent; and (c) agriculture sector is about 0.22 percent (Table 7). The lagged changes in output have positive and significant effects indicating effective interim growth policies. However, in the short run, the capital, manufacturing and services have a mixed effect, with both positive and negative contribution. This is plausible when low capital investment or inefficient and poor use of capital and technology in these sectors could result in negative effect outweighing the positive. The agriculture contribution has a negative effect on output growth in the short-run reflecting the poor performance in agriculture development.

Furthermore, the capital stock share is about 0.26 which is relatively close to the stylised value of one-third. The error correction term (ECT) has a correct (negative) coefficient of about -1.93 indicating a speedy convergence to long-run equilibrium. The Granger causality test (Table 8) reveals a unidirectional causation with income Granger-causing agriculture and services; with capital Granger-causing services; manufacturing Granger-causing capital stock; and bidirectional causation between income and manufacturing; and between capital stock and agriculture.

5. Conclusion and Policy Implications

In this paper, we have shown that sectoral contribution to long-run economic growth has been significant over the past four decades. However, agriculture contributed the lowest (0.22%) to income while manufacturing and services value added contribution are relatively larger (0.77 percent and 0.91 percent respectively). In the short run, the contribution is somewhat mixed, with lag growth rate having positive and significant effects. The Granger causality test reveals that there is a unidirectional relationship between income and agriculture, income and services, capital stock and services, and manufacturing and capital stock; and a bi-directional causation between income and manufacturing and capital stock and agriculture.

Notably, the lower contribution of agriculture in the long run and negative contribution in the short run is of particular concern to the overall sustainability of the economy. Therefore, government policy needs to be directed towards not only in developing and diversifying agricultural products but also in finding better markets for agricultural products, ensuring that agriculture is encouraged through efficient and cost-effective availability of resources such as land and capital. Similarly, effective policies to improve and capitalise on manufacturing and services sector performance will outweigh the poor overall

performance emerging from agriculture. The following points are put forward as specific policy guidelines:

(a) *Identification and development of agricultural zones:* The economy has agriculture-specific geographical setup. Therefore identifying and capitalising on each region of the country with different and diversified agricultural production base is important with the understanding that resources such as land and capital has to be made available and accessible to large scale producers with minimum hurdles.

(b) *Aid support:* aid received from donor agencies need to be channelled into agriculture projects, particularly towards those areas having the potential to generate sustainable income and employment. However, these need to be identified through rigorous feasibility studies and historical evidence.

(c) *Marketing and logistical support:* Projects related to agro-marketing need to be made effective. The drive need to come from relevant government bodies such as the Fiji Ministry of Primary Industries. Further, strengthening relationship with existing markets and identifying new markets and agriculture production should be part of the Ministry's long term strategic plans.

(d) *Private-Public Partnership*: Other industries, such as the financial sector, tourism and ICT need to be integrated with agriculture. Ensuring the availability of investment fund to buy land and other capital inputs for agricultural production, effective marketing, communication, logistics and transportation facilitation from producers to consumers need to be prioritised. Integrating private sector participation including manufacturing operations with agriculture will boost demand for certain agriculture products. Further, linking tourism (service) and food processing (manufacturing) with locally produced commodities need to be incentivised. Further, encouraging private sector and non-government organisation partnership in sub-sectors like fisheries, forestry, coconut, cash-crop among other industries are some important areas to look at.

(e) *Education, training and research*: specific sub-sector based research and training such as advanced methods in increasing production of agricultural commodities (such as sugar, taro, specific fish species, livestock, mahogany and coconut plantation), and financial literacy and development (loans and saving schemes related to specific sub-sectors), and the use of technology and media to access and penetrate local and international markets for new and existing commodities need to be promoted. Education in the production and use of locally produced items needs to be incentivised and more resources need to be channelled in scientific research in agriculture. Further, innovative ways to integrate primary production with manufacturing and services sectors need to be explored.

(f) *Import substitution and export promotion strategies*: the focus need to be more on branding, promoting and diversifying domestically produced commodities both in local and international markets to reduce dependency on imported items.

(g) *Key sub-sector reform*: improving both operational and managerial effectiveness with options on streamlining processes to reduce cost and making the industry internationally competitive are vital. Further, equally imperative is ensuring that domestically produced agricultural commodities meet the necessary health hygienic standards and are internationally competitive, and any unused capital and resources non-performing sectors need to be re-allocated to productive income generating projects.

(h) *Tax incentives and subsidies*: exemption of duties and taxes in critical export commodities such as sugar, taro, copra livestock farming among others need to be promoted and capital investment in overall agriculture and key service sectors such as financial services and ICT needs to be encouraged.

(i) *Legal and Institutional framework*: the legal aspects governing the three sectors need to be scrutinised so that (new) investors are encouraged to invest in various sectors however without compromising the law. Further, the right institutional environment and infrastructure needs to be in place so as to encourage new investments.

(j) *Active Participation in Bilateral, Regional and Multilateral Forum*: there is a need for an active participation in negotiating agricultural modalities with partner countries. For instance, in the current Doha Rounds of negotiations, Fiji is considered as a small vulnerable economy (SVE) and therefore has to be vigilant when it comes to tariff reductions and its impact on agricultural efficiency and the sensitive agricultural products. Further, the need to prioritise agricultural cooperation in trade discussions with the more developed countries and strengthening donor-relations with focus to improving agriculture are crucial.

6. References

Asian Development Bank (ADB) (2011) *Pacific Economic Monitor*, (February), ADB, Manila, Philippines.
http://www.adb.org/Documents/Reports/PacMonitor/pem-feb11.pdf#page=5. [Accessed: 11 March, 2011]

ADB (2010) *Asia Development Bank & Fiji Islands Fact Sheet 2009*, ADB, Manila, Philippines
http://www.adb.org/Documents/Fact_Sheets/FIJ.pdf. [Accessed: 7 March, 2011]

Banga, R. and Goldar, B. (2004) 'Contribution of Services to Output Growth and Productivity in Indian Manufacturing: Pre and Post Reforms', *Working Paper No. 139* (July), Indian Council for Research on International Economic Relations, India.
http://www.etsg.org/ETSG2004/Papers/banga.pdf [Accessed: 09 March, 2011]

Bezemer, D., and Headey, D. (2008) 'Agriculture, Development, and Urban Bias', *World Development*, Vol. 36, No. 8, pp.1342-1364.

Bhagwati, J.N. (1984) 'Splintering and Disembodiment of Services and Developing Nations', *The World Economy,* Vol. 7, No. 2, pp.133-143.

Binswanger H.P. and Deininger, K. (1997) 'Explaining Agricultural and Agrarian Policies in Developing Countries', *Journal of Economic Literature,* Vol. 35, No. 4, pp.1958-2005.

Bravo-Ortega, C. and Lederman, D. (2005) 'Agriculture and National Welfare around the World: Causality and international heterogeneity since 1960', *World Bank Policy Research Paper No. 3499*. Washingtom DC: The World Bank.

Chenery, H.B. (1960) 'Patterns of Industrial Growth', *The American Economic Review*, Vol. 50, No. 4, pp.624-654.

De Janvry, A. and Sadoulet, E. (2009) 'Agriculture Growth and Poverty Reduction: Additional Evidence', *The World Bank Research Observer,* Vol. 25, No. 1, pp.1-20.

Dethier, J. and Effenberger, A. (2011) 'Agriculture and Development A Brief Review of the Literature', *Policy Research Working Paper WP5553*, Washington D.C.: World Bank. http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2011/01/31/000158349_20110131131635/Rendered/PDF/WPS5553.pdf. [Accessed: 4 March, 2011]

Delgado, C., Hopkins, J., Kelly, V.A., and Hazell, P.B.R. (1998) 'Agricultural growth linkages in Sub-Saharan Africa', *Research Report 107*, Washington, DC: International Food Policy Research Institute.

Dercon, S. (2009) 'Rural Poverty: Old Challenges in New Contexts', *The World Bank Research Observer,* Vol. 24, No. 1, pp.1-28

Diao, X., Hazell, P.B.R., Resnick, D., and Thurlow, J. (2006) 'The role of agriculture in development: Implications for Sub-Saharan Africa', *IFPRI Development Strategy and Policy Division Discussion Paper No. 29*. Washington DC: International Food Policy Research Institute. http://www.ifpri.org/sites/default/files/publications/rr153.pdf. [Accessed: 18 March, 2011]

Dorosh, P., and Haggblade, S. (2003) 'Growth linkages, price effects and income distribution in Sub-Saharan Africa', *Journal of African Economies*, Vol. 12, No. 2, pp.207-235.

Doward, A., Kydd, J., Morrison, J., and Urey, I. (2004) 'A Policy Agenda for Pro-Poor Agricultural Growth', *World Development,* Vol. 32, No. 1, pp.73-89.

Francois, J.F. and Reinert, K.A. (1996) 'The role of Services in the Structure of Production and Trade: Stylized Facts from a Cross-Country Analysis', *Asia-Pacific Economic Review*, 2(1): 35-43. http://www.i4ide.org/people/~francois/docs/text9505.pdf. [Accessed: 10 March, 2011]

Gardner, L.B. (2005) 'Causes of Rural Development', *Agricultural Economics*, Vol. 32, No. 1, pp.21-41.

Gollin, D., Parente, S. and Rogerson, R. (2002) 'The role of agriculture in development', *The American Economic Review*, Vol. 92, No. 2, pp.160-164.

Gollin, D. (2010) 'Agricultural productivity and economic growth', In *Handbook of Agricultural Economics*, 4, ed. R. Evenson and P. Pingali, Amsterdam: North Holland.

Jalava, J. and Pohjola, M. (2008) 'The roles of electricity and ICT in economic growth', *Exploration in Economic History*, Vol. 45, No. 3, pp.270-287.

Jayaraman, T.K., Choong, C.K. and Kumar, R. (2010a) 'A Study on the Role of Remittances in Fiji's Economic Growth: An Augmented Solow Model Approach', *Working Paper No. 2010/06*, University of the South Pacific, Suva, Fiji. http://www.econ.fbe.usp.ac.fj/fileadmin/files/schools/ssed/economics/working_papers/2010/WP_6.pdf. [Accessed: 11 March, 2010]

Jayaraman, T.K., C.K. Choong, C.K., and Kumar, R. (2010b) 'Role of Remittances in Tongan Economy', *Migration Letters*, Vol. 7, No. 2, pp. 224-230.

Jayaraman, T.K., Choong, C.K., and Kumar, R. (2009) 'Role of Remittances in Economic Growth in Pacific Island Countries: A Study of Samoa', *Perspectives on Global Development and Technology*, Vol. 8, No. 17, pp.611-627.

Johnston, B.F. and Mellor, J.W. (1961) 'The Role of Agriculture in Economic Development", *The American Economic Review*, Vol. 51, No. 4, pp.566-593.

Kongsamut, P., Rebelo, S. and Xie, D. (2001) 'Beyond Balanced Growth', *The Review of Economic Studies*, Vol. 68, No. 4, pp.869-882.

Kumar R.R. (2011a) 'Do Remittances, Exports and Financial Development Matter for Economic Growth? A Case Study of Pakistan using Bounds Approach', *Journal of International Academic Research*, Vol. 11, No. 1, pp.18-27.

Kumar, R.R (2011b) 'Chapter 27: Role of Trade Openness, Remittances, Capital Inflows, and Financial Development in Vanuatu' in I. Sirkeci, J.H. Cohen and D. Ratha (eds.), *Migration and Remittances During the global Financial Crisis and Beyond*, pp. 331-339, World Bank (forthcoming).

Kumar, R.R., and Kumar, R. (2012), 'Exploring the nexus between information and communications technology, tourism and growth in Fiji', *Tourism Economics*, Vol.18, No. 2, (April), forthcoming.

Lewis, A.W. (1954) 'Economic development with unlimited supplies of labour', *The Manchester School*, Vol. 28, No. 2, pp.139-191.

Lipton, M. (1977) *Why poor people stay poor: A study of urban bias in world development*, London: Temple Smith.

Lipton, M. (1987) *Improving agriculture aid impact on low-income countries*. Sussex: Institute of Development Studies.

Matsuyama, K. (1992) 'Agricultural productivity, comparative advantage and economic growth', *Journal of Economic Theory*, Vol. 58, No. 2, pp. 317-334.

Mosley, P. (2002) 'The African green revolution as a pro-poor policy instrument', *Journal of International Development*, Vol. 14, No. 6, pp.695-724.

Pesaran, M.H., Shin, Y. and Smith, R. (2001), 'Bounds testing approaches to the analysis of level relationships', *Journal of Applied Econometrics*, Vol.16, No. 3, pp.289-326.

Rajan, R.G., and Subramanian, A. (2011) 'Aid, Dutch disease, and manufacturing growth', *Journal of Development Economics*, Vol. 94, No. 1, pp.106-118.
Reserve Bank of Fiji (RBF) (2010) *RBF Quarterly Report 2010*, Suva, Fiji. http://www.rbf.gov.fj/docs2/Quarterly%20Review%20(September%202010).pdf. [Accessed: 10 March, 2011]

Restuccia, D., Yang, D.T., and Zhu, X. (2008) 'Agriculture and aggregate productivity: A quantitative cross-country analysis', *Journal of Monetary Economics,* Vol. 55, No. 2, pp.234-250.

Rodrik, D. (2008) 'Understanding South Africa's economic puzzles', *Economics of Transition,* Vol. 16, No. 4, pp.769-797.

Self, S. and Grabowski, R. (2007) 'Economic Development and the Role of Agriculture Technology', *Agricultural Economics,* Vol. 36, No. 3, pp.395-404.

Tiffin, R. and Irz, X. (2006) 'Is agriculture the engine of growth?', *Agricultural Economics*, Vol. 35, No. 1, pp.79-89.

Timmer, C.P. (2002) Agriculture and economics development, in B. Gardner and G. Rausser (eds.), Handbook of agricultural economics, Vol. 2A, pp.1487-1546, Amsterdam: Elsevier.

World Bank (2010) *World Development Indicators and Global Development Finance,* Washington D.C.: World Bank.
http://databank.worldbank.org/ddp/home.do?Step=1&id=4. [Accessed: 24 February, 2011]

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